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MONTHLY REPORT

ON THE NUCLEAR FUEL MARKET

NUEXCO

HEADQUARTERS

Three Park Central
1515 Arapahoe Street
Suite 1045
Denver, Colorado 80202
Telephone: (303) 623-7317

Managing Director
Oren L. Benton

NORTHEAST UNITED STATES

100 Prospect Street
Century Plaza South
Stamford, Connecticut 06901
Telephone: (203) 323-1999
Telecopy: (203) 325-1483
Telex: 4750124 (NUEXCO C)

Managing Broker
Earl E. Hoellen, Jr.

SOUTHEAST UNITED STATES

Suite 905
Ten Piedmont Center
Atlanta, Georgia 30305
Telephone: (404) 262-7375
Telecopy: (404) 233-6210
Telex: 4611142 (NUEX ATL)

Managing Broker
M. Jerry Reaves

WESTERN UNITED STATES

Building 3, Suite 290
3000 Sand Hill Road
Menlo Park, California 94025
Telephone: (415) 854-1510
Telecopy: (415) 854-2115
Telex: 470674 (NUEXCO UI)

Managing Broker
George White, Jr.

EUROPE

13 chemin du Levant
01210 Ferney-Voltaire
France
Telephone: (33-50) 428035
Telecopy: (33-50) 428526
Telex: 385288 (NUEXCO F)

Managing Broker
James E. Vaughan

REGIONAL MANAGING BROKERS

AFRICA
James E. Vaughan

AUSTRALIA
George White, Jr.

CANADA
Wayne D. Fowler

EUROPE
James E. Vaughan

FAR EAST
Christian C. Guitton

(See inside back cover for list of Representatives and Consultants)

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MONTHLY REPORT ON THE NUCLEAR FUEL MARKET

September 1985 No. 205

R. WESLEY MILLER, *EDITOR* CLARK M. BEYER, *ASSOCIATE EDITOR*

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To Our Readers

Nuexco will host a hospitality suite during the Atomic Industrial Forum's Uranium Seminar in Santa Fe, New Mexico. The suite will be located at the La Fonda Hotel, September 29–October 2. We look forward to seeing you there.

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PRICING

NATURAL URANIUM AND SECONDARY MARKET CONVERSION

(All data as of August 31, 1985)

The **Exchange Value** is **$16.00** per pound U_3O_8, up $0.25 since last month. **Active supply** of natural uranium (U_3O_8 and UF_6) for spot or near-term delivery totals **3,340,000** pounds equivalent U_3O_8 as concentrates or UF_6, up 305,000 pounds since last month. The corresponding figure for **active demand** is **1,205,000** pounds, up 750,000 pounds. The spot and near-term **supply-demand ratio** fell to 2.8:1.

The *Current Market Data* section of this Report lists three natural uranium sales transactions, involving a total of approximately 400,000 pounds U_3O_8 equivalent. All of the transactions reported this month involved deliveries in the near term, and also met the criteria for inclusion in the current Transaction Value calculation.

The **UF_6 Value** is **$44.50** per kilogram U in UF_6, up $0.50 since last month. One of the transactions reported this month involved UF_6.

The **Transaction Value** is **$15.10** per pound U_3O_8, up $0.35 since last month. The current Transaction Value includes 14 transactions involving a total of 2.4 million pounds U_3O_8 or equivalent UF_6 and covers a period of 3 months.

The **Loan Use Charge Rate** is unchanged at **5 percent** per annum.

* * *

The market for natural uranium firmed somewhat in this relatively quiet month, and the Exchange Value rose slightly to $16.00; three sales took place at prices approximately equal to that level. Recent bids and offers continued to reflect the buyers' and sellers' perception of market firming. While demand increased this month, buyers are still content to wait for attractive opportunities to appear, rather than feeling pressure to buy on a certain schedule. The prevailing perception among sellers that a gradual price rise is underway has been reflected in gradually rising offers.

In Europe, the customary summer vacation period inhibited activity. Moreover, the continuing decline of the US dollar generally resulted in little real change in either the Exchange Value or UF_6 Value as expressed in European currencies. Six to ten months ago the US dollar was rising steadily against most currencies, and had set new records against the French franc, West German mark, and Italian lira. Recent fears that the US economy is stagnating, however, have contributed to a sharp decline in the dollar's value overseas in the last several months. Since late February, the dollar's value has declined 25 percent against the British pound, 14 percent against the lira, and 18 percent against the franc. Lowering interest rates for the past five months have discouraged foreign investment in the USA, driving down the value of US currency.

* * *

The UF_6 Value also rose in conjunction with the Exchange Value, but at a slower rate. The preponderance of UF_6 offered in the market in the last few months has diminished slightly, and the UF_6 Value remains just below the algebraic sum of the Exchange and Conversion Values. In addition, the buyer preference for UF_6 appears to have waned compared to recent months, and seems to be shifting back toward concentrates somewhat.

* * *

The **Conversion Value** is **$1.60** per pound U in UF_6, unchanged since last month. The secondary conversion market has remained basically unchanged over the last several months, and the few secondary market transactions occurring generally have involved small quantities. These transactions often are utilized to complete deconversion swaps or as related parts of larger deals. One conversion transaction, involving less than 50,000 pounds U as UF_6, is reported. Active supply of secondary market conversion services for delivery within three years totals 325,000 pounds U as UF_6. Active secondary market demand for conversion amounts to 525,000 pounds U in UF_6.

ENRICHED URANIUM AND SWUS

The Nuexco **SWU Values** as of August 31, 1985 are:

1. For **DOE origin**, a tails assay of 0.30 weight-percent U^{235}, for delivery by the end of FY86, and certifiable as excess, $85 per SWU, unchanged.
2. For **other** SWUs (includes DOE origin SWUs not certifiable as excess and non-DOE origin SWUs), for delivery by the end of calendar year 1986, $81 per SWU, unchanged.

One secondary market SWU transaction is reported, involving less than 50 thousand SWUs.

* * *

A lack of activity in the markets for SWU of either origin continued throughout August. Notably absent this month was a bargain-priced opportunity similar to those that have appeared one at a time in recent months. Each time this type of opportunity arose, competition for the

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sale served to drive down prices. Without the competition stemming from presence of a firm buyer, there was little downward pressure on prices. Conversely, the lack of a number of interested buyers entering the market at the same time for either type of SWUs resulted in no upward price movement.

* * *

DOE sent a letter to its customers on September 4 informing them of the price for enrichment services in 1986. For USEC customers, the fiscal year 1986 price is $125 per SWU, a seven-percent decline from the 1985 price. The new price will take effect October 1, 1985. In addition, DOE has set a "high assay charge" of $492 per SWU for enrichments of 10 weight percent (w/o) or greater, effective April 1, 1986.

Since a customer taking high-enriched uranium from DOE would pay $492 per SWU for each SWU taken over 10 w/o, the *weighted average price* paid for enrichment services contained in the product would vary according to the assay. Using a 0.2 w/o tails assay, the price per SWU for 20 w/o product should be around $154 per SWU. For 93 w/o material, the weighted average price is calculated to be slightly greater than $184 per SWU. DOE sources have not been able to verify these price estimates, indicating that their interpretation of how the weighted average price is calculated may differ significantly from Nuexco's.

* * *

DOE has disclosed its long-term enrichment strategy, which includes a target price of $60 per SWU in the year 2000, in a meeting with non-US utilities. DOE representatives held a uranium enrichment seminar in July 1985, during which some of the issues of the enrichment program were covered, as summarized below.

Enrichment cost reductions—The present price of $135 per SWU will be reduced to $125 per SWU for fiscal year 1986. The price may be reduced further to $115 per SWU, competitive with European enrichers, within four years. Throughout the 1990s, according to DOE, the price may be reduced to a level unrivaled by any competitors, culminating in a $60 per SWU price in the year 2000.

Future of Diffusion Plants—DOE predicts that a $250 million cost reduction will be accomplished over the years 1986 to 1991 at the two operating gaseous diffusion plants at Paducah, Kentucky and Portsmouth, Ohio. DOE plans to improve the economic efficiency of the plants by utilizing off-peak electricity for 50 percent of the total power demand. Finally, the Oak Ridge, Tennessee plant, which will be placed on standby as a cost-cutting measure, will resume production if the demand exceeds 14,000 metric tons enriched UF_6.

Selection of AVLIS—Some of the rationale DOE presented to justify its decision to proceed with the development of Atomic Vapor Laser Isotope Separation (AVLIS) as the future US enrichment technology, are:

1. The potential for reductions in production costs is high.

2. The amount of investment required for AVLIS, supposedly no more than $3 billion, may be half as much as that required to fund an advanced gas centrifuge plant.

3. A small-scale AVLIS plant can run as efficiently as a large-scale plant.

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CURRENT MARKET DATA

August 31, 1985	Market Values	Active Supply[1] (thousands)	Active Demand[1] (thousands)
EXCHANGE VALUE	**$16.00**/lb. U_3O_8	3,340	1,205
UF_6 VALUE	**$44.50**/kgU		
CONVERSION VALUE	**$1.60**/lb. U as UF_6	325	525
SWU VALUES			
DOE origin, certifiable as excess, 0.3 tails assay delivery by the end of FY86	**$85**/SWU		
Other SWUs (non-DOE or non-certifiable) delivery by the end of calendar year 1986	**$81**/SWU		
LOAN USE CHARGE RATE	5%/annum	2,800	500

TRANSACTION VALUE	$/lb. U_3O_8	Millions of Pounds	Number of Transactions	Number of Months
	15.10	2.4	14	3

[1]Supply and demand tables in the *Current Market Data* section of this Report detail the numbers for each category.

DEFINITIONS

1. The **Exchange Value** is Nuexco's judgment of the price at which transactions for significant quantities of natural uranium concentrates could be concluded as of the date indicated.
2. The **UF_6 Value** is Nuexco's judgment of the price at which spot and near-term transactions for significant quantities of natural uranium hexafluoride could be concluded as of the date indicated.
3. The **Conversion Value** is Nuexco's judgment of the price at which spot and near-term transactions for significant quantities of conversion services could be concluded in the secondary market as of the date indicated.
4. The **SWU Values** represent Nuexco's judgment of the price at which transactions for the sale of significant quantities of SWUs of stated origin for delivery in the specified time period could be concluded as of the date indicated.
5. The **Loan Use Charge Rate** is Nuexco's judgment of the annual interest rate at which uranium loans could be concluded as of the date indicated.
6. The **Transaction Value** is a weighted average price of recent natural uranium sales transactions. The calculation is based on prices paid in:
   a. Transactions closed within the previous three-month period for which delivery is scheduled within one year of the transaction date;
   b. At least ten transactions;
   c. Transactions involving a sum total of at least 2 million pounds U_3O_8 equivalent.

   The sample time is extended as necessary to include these minima. Other currencies are converted to US dollars using conversion rates in effect on or near the transaction date.

DERIVATIONS AND COMMENTS

1. All Market Values are based on:
   a. Data from recently completed transactions.
   b. Data from pending transactions.
   c. Firm bids to buy or borrow, and firm offers to sell or lend.
   d. Prices purchasers or rates borrowers have expressed a willingness to pay, but for which Nuexco is not aware of firm bids to buy or borrow, and prices sellers or rates lenders have expressed a willingness to offer, but for which Nuexco is not aware of firm offers to sell or lend.
2. Prices associated with deliveries under old or renegotiated contracts or other than arm's-length transactions are not considered in the determination of these Market Values.
3. In the determination of the Conversion Value, Nuexco does not consider transportation charges other than those customarily provided by primary suppliers of conversion services.
4. The prices of conversion services or SWUs delivered under long-term contracts with primary suppliers are not considered in the determination of either the Conversion Value or SWU Value.
5. For the DOE SWU Values, Nuexco converts SWU prices at varying tails and product assays to equivalent SWU prices at a tails assay of 0.30 weight-percent U_{235} and a product assay of 3.0 weight-percent U_{235}, assuming feed costs corresponding to the Nuexco Exchange and Conversion Values determined as of the same date.
6. In calculating the Transaction Value, Nuexco does not account for the price of uranium delivered in connection with contracts which call for "market price" mechanisms. This exclusion applies particularly to contracts in which delivery prices are expressed as a function of future Exchange Values or any other indeterminant variable. Also excluded from the calculation are any other transactions in which the delivery price is defined in such a way that it cannot currently be determined.

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CURRENT MARKET DATA

EXCHANGE VALUE EXPRESSED IN SELECTED PRODUCER & CONSUMER CURRENCIES[1]

Country (currency)	per lb. U_3O_8 in Concentrates			per kg. U in Concentrates		
	This Month (Aug. 31, 1985)	Last Month (July 31, 1985)	12 Months Ago (Aug. 31, 1984)	This Month (Aug. 31, 1985)	Last Month (July 31, 1985)	12 Months Ago (Aug. 31, 1984)
Australia (dollar)	22.74	21.82	20.60	59.13	56.74	53.56
Belgium (comm. franc)	899.89	893.87	1,018	2,339	2,324	2,647
Canada (dollar)	21.78	21.29	22.71	56.63	55.35	59.03
Finland (markka)	94.45	93.14	105.87	245.55	242.14	275.23
France (franc)	135.82	135.43	154.87	353.11	352.08	402.62
FRG (mark)	44.46	44.50	50.49	115.58	115.70	131.26
Italy (lira)	29,840	29,689	31,418	77,576	77,185	81,681
Japan (yen)	3,793	3,739	4,220	9,862	9,721	10,971
Netherlands (guilder)	50.09	49.81	56.91	130.22	129.50	147.95
South Africa (rand)	45.71	32.21	27.34	118.85	83.74	71.09
Spain (peseta)	2,613	2,579	2,884	6,795	6,705	7,498
Sweden (krona)	132.45	130.38	145.11	344.34	338.96	377.25
Switzerland (franc)	36.45	36.33	41.96	94.77	94.46	109.08
UK (pound)	11.43	11.11	13.34	29.72	28.89	34.68
US (dollar)	16.00	15.75	17.50	41.60	40.95	45.50

TRANSACTION VALUE EXPRESSED IN SELECTED PRODUCER & CONSUMER CURRENCIES[1]

Country (currency)	per lb. U_3O_8 in Concentrates			per kg. U in Concentrates		
	This Month (Aug. 31, 1985)	Last Month (July 31, 1985)	12 Months Ago (Aug. 31, 1984)	This Month (Aug. 31, 1985)	Last Month (July 31, 1985)	12 Months Ago (Aug. 31, 1984)
Australia (dollar)	21.46	20.44	19.31	55.80	53.13	50.19
Belgium (comm. franc)	849.27	837.12	954.04	2,208	2,176	2,480
Canada (dollar)	20.56	19.94	21.28	53.45	51.83	55.32
Finland (markka)	89.14	87.23	99.21	231.74	226.77	257.93
France (franc)	128.18	126.83	145.13	333.25	329.72	377.31
FRG (mark)	41.96	41.68	47.32	109.08	108.35	123.01
Italy (lira)	28,161	27,804	29,443	73,213	72,284	76,546
Japan (yen)	3,580	3,502	3,955	9,307	9,104	10,281
Netherlands (guilder)	47.27	46.65	53.33	122.89	121.27	138.65
South Africa (rand)	43.14	30.16	25.63	112.16	78.42	66.62
Spain (peseta)	2,466	2,415	2,703	6,412	6,279	7,026
Sweden (krona)	125.00	122.10	135.99	324.97	317.44	353.54
Switzerland (franc)	34.40	34.03	39.32	89.44	88.46	102.22
UK (pound)	10.79	10.41	12.50	28.05	27.05	32.50
US (dollar)	15.10	14.75	16.40	39.26	38.35	42.64

[1]Calculated using currency exchange rates published in the *Wall Street Journal* on August 30, 1985.

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CURRENT MARKET DATA

CONVERSION VALUE EXPRESSED IN SELECTED PRODUCER & CONSUMER CURRENCIES[1]

Country (currency)	per lb. U as UF_6			per kg. U as UF_6		
	This Month (Aug. 31, 1985)	Last Month (July 31, 1985)	12 Months Ago (Aug. 31, 1984)	This Month (Aug. 31, 1985)	Last Month (July 31, 1985)	12 Months Ago (Aug. 31, 1984)
Australia (dollar)	2.27	2.22	0.94	5.01	4.89	2.08
Belgium (comm. franc)	89.99	90.81	46.54	198.39	200.19	102.60
Canada (dollar)	2.18	2.16	1.04	4.80	4.77	2.29
Finland (markka)	9.45	9.46	4.84	20.82	20.86	10.67
France (franc)	13.58	13.76	7.08	29.94	30.33	15.61
FRG (mark)	4.45	4.52	2.31	9.80	9.97	5.09
Italy (lira)	2,984	3,016	1,436	6,578	6,649	3,166
Japan (yen)	379.33	379.87	192.91	836.27	837.46	425.29
Netherlands (guilder)	5.01	5.06	2.60	11.04	11.16	5.74
South Africa (rand)	4.57	3.27	1.25	10.08	7.21	2.76
Spain (peseta)	261.35	261.99	131.84	576.18	577.60	290.66
Sweden (krona)	13.25	13.25	6.63	29.20	29.20	14.62
Switzerland (franc)	3.65	3.69	1.92	8.04	8.14	4.23
UK (pound)	1.14	1.13	0.61	2.52	2.49	1.34
US (dollar)	1.60	1.60	0.80	3.53	3.53	1.76

SWU VALUES AND UF_6 VALUE EXPRESSED IN SELECTED PRODUCER & CONSUMER CURRENCIES[1]

Country (currency)	DOE SWU Delivery by the End of FY86 (August 31, 1985)	Non-DOE SWU Delivery by the End of CY86 (August 31, 1985)	UF_6 Value per kg. U in UF_6 This Month (August 31, 1985)	UF_6 Value per kg. U in UF_6 Last Month (July 31, 1985)
Australia (dollar)	120.82	115.14	63.26	60.97
Belgium (comm. franc)	4,781	4,556	2,503	2,497
Canada (dollar)	115.73	110.28	60.59	59.48
Finland (markka)	501.77	478.16	262.69	260.20
France (franc)	721.56	687.61	377.76	378.33
FRG (mark)	236.18	225.06	123.65	124.33
Italy (lira)	158,523	151,063	82,991	82,941
Japan (yen)	20,152	19,203	10,550	10,446
Netherlands (guilder)	266.09	253.57	139.31	139.15
South Africa (rand)	242.86	231.43	127.14	89.98
Spain (peseta)	13,884	13,231	7,269	7,205
Sweden (krona)	703.64	670.53	368.38	364.24
Switzerland (franc)	193.67	184.55	101.39	101.50
UK (pound)	60.74	57.88	31.80	31.04
US (dollar)	85.00	81.00	44.50	44.00

[1]Calculated using currency exchange rates published in the *Wall Street Journal* on August 30, 1985.

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CURRENT MARKET DATA

RECENT TRANSACTIONS[1]

Uranium Sales

Nuexco Transaction Number	Delivery Period	Approximate Quantity (thousands of pounds, U_3O_8 equivalent)	Approximate Price as Percent of Current Exchange or UF_6 Value	Seller	Buyer	Remarks
3544	1985	50-100	99	US Producer	Trader	
3539	1985	50-100	100	US Producer	US Utility	
3512	1985-1986	101-300	99	Canadian Producer	US Utility	UF_6.

Secondary Market Conversion Services

Nuexco Transaction Number	Delivery Period	Approximate Quantity (thousands of pounds, U equivalent)	Approximate Price as Percent of Current C.V.	Seller	Buyer	Remarks
3547	1985	less than 50	96	US Utility	US Utility	

Enrichment Services
Secondary Market Sales

Nuexco Transaction Number	Delivery Period	Approximate Quantity[2] (thousands of SWUs)	Approximate Price[3] as Percent of Current SWU Value[4]	Seller Group	Buyer Group	SWU Origin	Remarks
3508	1986	less than 50	less than 100	Trader	US Utility	DOE	0.2 percent tails assay.

[1] Transactions listed are not limited to those in which Nuexco was involved, but also include others of which Nuexco is aware.
[2] If tails assay is unknown or unspecified, Nuexco's calculation of SWU quantity assumes 0.30 w/o tails assay.
[3] Price is not normalized to 0.30% tails assay.
[4] Refers to SWU Value that corresponds to SWUs included in transaction. When prices and SWU values are expressed as discounts (e.g., X dollars less than DOE's USEC base price at time of delivery), the percentage refers to the ratio of the *discounts*, not the ratio of the prices.

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URANIUM SUPPLY
(August 31, 1985)

Nuexco Project Number	Delivery Period[1] (Thousands of Pounds U_3O_8) Spot or Near-term[2]	Intermediate or Long-term	Remarks
Available for Sale:			
ACTIVE			
2389*	350	—	
2623*	1,000	1,000	
2654	500	500 per year	UF_6
2804*	100	—	
2668*	50	—	UF_6
2705A	200	—	UF_6
2711*	80	—	
2728	200	500 per year	1986-90
2736*	80	—	
2746	180	—	UF_6
2774*	100	—	
2814	500	500	UF_6
2625	—	250 per year	1987-89
2680	—	250 per year	1986-92
TOTAL:	3,340		
INACTIVE			
1860*	250	1,000 per year	UF_6
2191	125	—	UF_6
2335*	275	—	
2336	250	250 per year	1985-94
2483*	545	—	
2553	300	—	
2297	—	200 per year	1986-89
TOTAL:	1,745		

*New or revised since last month.
[1]Measured from the date of this Report.
[2]For delivery within one year. This category excludes material deliverable within one year under other than spot or near-term contracts.
Projects removed since last month: 2134.

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CURRENT MARKET DATA

URANIUM DEMAND
(August 31, 1985)

Nuexco Project Number	Delivery Period[1] (Thousands of Pounds U_3O_8) Spot or Near-term[2]	Intermediate or Long-term	Remarks
Inquiries to Purchase:			
ACTIVE			
2590	75	—	U_3O_8 or UF_6
2681*	500	1,500	UF_6 or U_3O_8; 1987-88
2757	130	—	UF_6
2767*	200	—	UF_6
2775*	200	—	
2784*	100	—	
2217	—	1,000 per year	1989-95
2507	—	600	1987-89
2741	—	600	
2758	—	500	UF_6
TOTAL:	1,205		
INACTIVE			
2548	290	—	
2576	20	—	UF_6
2636	100	—	
2718	250	350	
2414	—	175	
2586*	—	600	1986-90
2643	—	150 per year	1987 on
2694	—	625	1987; UF_6
TOTAL:	660		

*New or revised since last month.
[1]Measured from the date of this Report.
[2]For delivery within one year. This category excludes material deliverable within one year under other than spot or near-term contracts.
Projects removed since last month: 2676.

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LOAN SUPPLY AND DEMAND
(August 31, 1985)

Nuexco Project Number	Delivery Period[1] (Thousands of Pounds U3O8) Within 1 Year	Beyond 1 Year	Remarks
Available for Loan: ACTIVE			
1938*	2,000	—	UF6
2469A*	800	—	
TOTAL:	2,800		
Available for Loan: INACTIVE			
2036	500	—	
2483	550	—	
2667	800	—	
TOTAL:	1,850		
Inquiries to Borrow: ACTIVE			
2606*	500	—	
TOTAL:	500		

*New or revised since last month.
[1]Measured from the date of this Report.
Projects removed since last month: None.

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CURRENT MARKET DATA

CONVERSION SUPPLY AND DEMAND
(August 31, 1985)

Nuexco Project Number	Delivery Period[1] (Thousands of Pounds U as UFs) Within 3 Years	Beyond 3 Years	Remarks
Available for Sale:			
ACTIVE			
2511	—	300	1986-90
2725*	325	—	
TOTAL:	325		
Inquiries to Purchase:			
ACTIVE			
2596*	250	—	
2617	275	420	1986-91
TOTAL:	525		
INACTIVE			
2529	225	—	
2724	—	375	1989-93
TOTAL:	225		

*New or revised since last month.
[1]Measured from the date of this Report.
Projects removed since last month: 2587, 2709.

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SWU SUPPLY AND DEMAND
(August 31, 1985)

Nuexco Project Number	Delivery Period[1] (Thousands of SWUs) Spot or Near-term[2]	Intermediate or Long-term	Remarks
Available for Sale:			
ACTIVE			
2410*	350	—	
2607	200	—	
2624	100	—	
2684*	35	—	
2705*	100	—	
2571	—	55	1987
TOTAL:	785		
INACTIVE			
2359	—	200	
2378	—	120	1988
2510*	—	50	
2652	—	25	1986
TOTAL:	0		
Inquiries to Purchase:			
ACTIVE			
2400	—	150	1987-90
2519	—	30 per year	1987 on
2578	115	—	
2597*	—	30	
2668	—	15	
2742*	15	—	
2747	30	50	1987 on
TOTAL:	160		
INACTIVE			
2500	—	170	1988
2512	—	15 per year	1987 on
2595	—	50	1986
TOTAL:	0		

*New or revised since last month.
[1]Measured from the date of this Report.
[2]For delivery within one year. This category excludes SWUs deliverable within one year under other than spot or near-term contracts.
Projects removed since last month: 2693, 2706.

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ANALYSIS & COMMENTARY

SOUTH AFRICA

Introduction

As the political and social turmoil continues in South Africa, relations with other nations worldwide have begun to suffer and, more importantly, South Africa's economy has begun to lose the confidence and support of the international banking community. The sense of crisis has deepened in the wake of escalating racial violence, declining currency values, the imposition of emergency financial controls, and the withdrawal of credit by international banks. The possibility of international trade sanctions, however symbolic, and the recently suspended mineworkers' strike have drawn a great deal of attention, but the key to this situation lies in its effect on the nation's economy. The pressure from the international banking community could accomplish what external political pressure could not achieve, a peaceful dismantling of apartheid. Nevertheless, the large stockpiles held by producers will keep uranium supply channels open for the foreseeable future. Even if a black majority government takes power in South Africa, the nation earns half of its foreign exchange revenue from gold, so gold mining operations, and therefore uranium production, will certainly continue.

Civil Unrest

A government-declared state of emergency, covering many black townships and granting broad arrest powers to police, took effect in late July. It was designed to curb the violence, but instead the crisis has grown into the country's worst in more than twenty-five years. The declaration of a state of emergency in 36 magisterial districts around Johannesburg and in the Eastern Cape, combined with rioting in black townships, and State President P. W. Botha's ruling National Party's refusal to negotiate with leaders recognized by black South Africans, have led to increased worldwide denunciation of apartheid.

In mid-August, speculation abounded that Botha would announce unprecedented reforms as a response to rising internal and external pressures, both political and economic. Rumors reinforced by South African officials heightened the optimism that preceded Botha's speech. However, the August 15 speech, presented at the Natal provincial congress of the National Party, disappointed many with its harsh tone and uncompromising message. Botha's vague references to the prospect of unspecified future constitutional discussions involving "all South African citizens," disappointed expectant world observers. In fact, because the country's 24 million blacks are presently denied the rights of citizenship, Botha's remarks could be interpreted as having promised nothing at all. Stressing defiance far more than plans for reforms, Botha issued a blunt warning that foreign governments pressing Pretoria to change need not expect their efforts to bear fruit any time in the near future.

Mineworkers' Strike

Members of the National Union of Mineworkers (NUM), the largest and most powerful black trade union, on September 1 struck gold, uranium, and coal mines owned by three of the six South African mining houses. The NUM had announced that 60,000 would strike, but later acknowledged that fewer than expected had done so. The Chamber of Mines claimed that only 14,000 struck, but the NUM claimed 28,000 strikers (6,000 at mines where a strike had been declared and 22,000 at others where union members had stopped work in support of the main strikes). The only uranium mines affected were Hartebeestfontein and Driefontein.

The workers struck over economic issues, but they also made two other demands that constituted a political threat to the Botha government.

1. They wanted authorities to end the state of emergency that had been declared in 36 magisterial districts.
2. They wanted to government to drop its threat to "repatriate" (deport) black mineworkers in retaliation for any international sanctions imposed against South Africa.

The increasingly militant union, created three years ago and headed by general secretary Cyril Ramaphosa, claims a dues-paying membership of 150,000. Ramaphosa called the strike after Gold Fields, Gencor (General Mining Corporation), and Anglo-Vaal refused to meet NUM demands for a 22-percent across-the-board pay increase. The mining companies had offered 14-percent to 19-percent pay increases for various categories of workers. Three other companies reached agreement with the union over pay increases—Rand Mines, Johannesburg Consolidated Investments (JCI), and Anglo American Corporation. (The greatest union membership is at Anglo American Mines.)

South African legislation (the Mines and Works Act) contains definitions of "scheduled persons" affecting 13 categories of workers. By requiring special certification for those jobs (from underground blasting to driving winding engines to mine manager) and, by denying that certification to blacks, the government has maintained a *de facto* segregation known by the apartheid code-phrase, "job reservation." Although only two percent of the total

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jobs are technically included in these reserved categories, they represent job security for about 30 percent of the industry's white workers. Furthermore, the existence of government-imposed distinctions among workers, rather than market-determined distinctions, has had the effect of artificially depressing blacks' wages. White *miners* typically receive more pay than their black *mineworker* counterparts. The NUM claims that differential is typically a ratio of 6 to 1; the Chamber of Mines resists such a generalization, preferring instead to concentrate on the large percentage gains made by blacks relative to whites over the past 5 to 10 years. The South African government had announced in 1981 its intention to repeal the job reservation legislation, subject to agreement between the Chamber of Mines and the white unions on certain conditions for job security. In May 1985, however, the Minister of Mineral and Energy Affairs announced that the government would enact the necessary legislation in the next session of parliament, whether or not that agreement had been reached. If that takes place, the wage differential should diminish even more rapidly than heretofore. However, the Botha government's response to the current crisis has raised doubts about when, if ever, the government will allow such a move.

From the outset, observers generally thought that the strike would be short in duration, partly because of the union's lack of resources to sustain its members while on strike. That expectation was borne out after only three days, when the NUM suspended the strike after 5,000 of its members were fired. The mass firing by Gold Fields of South Africa, Ltd., clearly broke the strike. That tactic has been used before and was anticipated (and feared) by the union. Even after the strike had been suspended, Gencor announced its intention to fire another 900 blacks (of a total of 1,100) at its Marievale gold mine in retaliation for their having taken part in the strike. Although the strike had severely disrupted mining operations, the processing of stockpiled ore allowed for the continuance of full output. The mining companies decisively won this first round. The striking mineworkers did achieve one small success, however. They managed for the first time to break the solid front that had been presented by the mining companies and won some larger pay increases as a result. But in the process, they found themselves maneuvered into striking the mines where the union was weakest and against companies that had taken the hardest line in negotiations.

While seeking to standardize pay offers to black employees through the Chamber of Mines, mining companies historically have presented a united front to the union. That unity was broken when Anglo American Corp. improved on the Chamber's initial offer to the union and Rand Mines and JCI quickly followed suit by matching Anglo American's offer of pay increases ranging from 17 to 22 percent, with increased leave allowances. Thus, strikes occurred only at Driefontein (operated by Gold Fields), Hartebeestfontein (operated by Anglo-Vaal), and Marievale (operated by Gencor).

Urging its members to return to work, the union's executive council gave three reasons for its latest action:

1. To save members' jobs;
2. To prevent further violence at the mines;
3. To challenge in court the companies' right under South African labor law to dismiss strikers.

The union also said it would seek a court injunction to prevent management from deporting the dismissed workers. Under South African law, 97 percent of the country's black mineworkers must be migrant workers from neighboring countries or so-called tribal homelands (areas to which they have been assigned under the apartheid laws). The union also charged that the three mining companies by their actions were attempting to break the union as well as the strike. For example, mine security forces had arrested more than 120 union supporters on charges of intimidating and harassing miners reporting to work. Union leaders countered with charges that violent intimidation by employers had caused the lower than expected strike participation. Independent verification of those conflicting claims was not possible because the mining companies closed their properties to reporters.

External Pressure

Botha's August 15 speech appeared to strengthen international opposition to apartheid and to the policies of the South African government. Demonstrating the degree of their concern, the European Community nations[1] pointedly recalled their respective ambassadors for "consultation" in late August. In keeping with the EC member nations' general aversion to the use of unilaterally imposed trade sanctions, they held a joint meeting in Luxembourg to facilitate the formulation of a unified response to the South African situation. They then designated the foreign ministers of Italy, Luxembourg, and the Netherlands as representatives from the Community as a whole, and delegated them to return to South Africa on a fact-finding mission. The EC delegation met with President Botha and other officials on August 31, and later recommended that

[1]Belgium, Denmark, France, FRG, Greece, Ireland, Italy, Luxembourg, Netherlands, and the UK.

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the EC forego the imposition of economic sanctions against South Africa, at least temporarily. The EC has since adopted the recommendation of the delegation. The guiding philosophy appears to be that economic disengagement would only exacerbate South Africa's problems, and that the EC offers the most effective mechanism for the handling of trade matters. However, France did take some independent action when the Prime Minister announced a government prohibition on new investment in South Africa.

In the USA, mounting Congressional pressure soon will force President Reagan to make a decision regarding the US response to the South African situation. While the President continues to support the policy of "constructive engagement" (persuasion toward reform rather than overt political and economic pressure), members of Congress have been urging Reagan to accept a compromise bill containing limited economic sanctions. The bill came about as a result of an agreement reached by Senate and House conferees several weeks ago. If enacted, the bill would prohibit exports of nuclear goods and technology to South Africa. That provision would be moot, however, since such exports are already forbidden by virtue of the fact that South Africa has not signed the Nuclear Nonproliferation Treaty.

As late as September 1, Reagan threatened to veto any bill containing sanctions, saying that it would hurt South Africa's blacks most. However, as it has become clear that there is enough Congressional support for the bill to override a Reagan veto, it now appears that Reagan will impose economic sanctions by means of an executive order. The executive action, like the compromise bill, would ban the sale of Krugerrand gold coins, prohibit most new US government loans to South Africa, and halt the sale of computer equipment used to enforce apartheid policies. Also like the compromise bill, Reagan's executive order would prohibit shipments of nuclear equipment or technology until South Africa agrees to the Nuclear Nonproliferation Treaty.*

While the proposed compromise legislation would allow the President to recommend to Congress further sanctions if South Africa does not take measures within one year to dismantle apartheid, Reagan's executive order would no doubt modify that stance and allow more time for changes. Moreover, *any* sanctions, whether imposed via an executive order or a legislative act, would not apply to existing contracts.

*President Reagan signed the Executive Order on September 9, 1985.

Switzerland and Sweden, which are not members of the EC, have been making their policies independently for some time. A strict Swedish government policy dating back to January 1984 prohibits utilities from buying South African uranium. Switzerland has prohibited arms exports to South Africa since the 1970s, but in general does not participate in sanctions.

In Canada, the government has ordered Eldorado Nuclear Ltd. to make no more agreements to convert "Namibian uranium imported from South Africa." The government will honor existing contracts and presumably would cancel the restriction if South Africa accepted the United Nations plans for Namibian independence.

Australia announced economic sanctions against South Africa, including a freeze on investments and a ban on weapons imports, although it did not sever diplomatic relations with Pretoria. Australian Prime Minister Hawke's cabinet issued a detailed report following the Botha speech, noting that the sanctions would not amount to a total trade embargo. However, the sanctions will ban exports of oil and petroleum products, computer hardware, and other products which would be of use to South African security forces. In addition, the import of Krugerrand gold coins and South African military equipment will be prohibited, and direct investment, either into South Africa by the Australian government or vice versa, also will be prohibited. Australian officials had decided on the sanctions before Botha's address, but had delayed implementation in the hope that he might make some concessions to blacks in his August 15 speech. In any event, the Australian sanctions will have little practical effect, as South Africa and Australia do not trade extensively with each other.

Economic Effects

Earlier this year, the South African economy seemed to be emerging from three years of deep recession. But just as interest rates were dropping and economic activity was increasing, the escalation of racial violence caused foreign investors to become anxious about the security of South African investments. Foreign bankers refused to extend the deadline for repayment of South Africa's international debt. The total amount was $17 billion, of which $12 billion is short-term.

The reextension of those loans had become routine, so the resulting sudden demand for large quantities of dollars sent the rand tumbling to its lowest level in history against the US dollar, $0.35. At the end of August, South Africa suspended trading on the country's stock and currency exchanges. According to Finance Minister Barend

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du Plessis, the steps were taken to enable South Africa to "continue to meet all international obligations." The governor of South Africa's central bank reported that 5.6 billion more rand had left the country in the last 18 months than had entered. Since a state of emergency was declared in 36 magisterial districts on July 20, the rand has lost almost one-fourth of its value against the dollar.

Several days after the suspension of trading took effect, Finance Minister du Plessis announced a freeze on repayments of principal on the country's $17 billion in foreign debt and the reintroduction of the two-tier financial rand exchange market applicable to foreign investments. The rand then recovered to $0.45. The freeze on repayment of capital will last until December 31, by which time the government hopes to have negotiated the extension of credit lines sufficient to cover the $12 billion in short-term portion.

Du Plessis also said the emergency exchange controls would discourage disinvestment because investors would not be able to export the proceeds from selling their holdings in South Africa. Payments of interest and dividends, and all trade, will be conducted at the commercial rand rate. However, the repatriation by foreign investors of their capital and profits thereon will be at the financial rand exchange rate.

Uncertain over the precise mechanism by which South Africa will repay any new debts, some leading US banks have ceased issuing the letters of credit for South African purchases of US goods. Because South African imports annually amount to about $14 billion and exports $18 billion, letters of credit are critical to the nation's economy. Such an interruption in short-term credit, following so closely after the international banking community's withdrawal of key short-term credit lines, will severely disrupt the South African economy.

South Africa is expected to say that it will spread repayments over a two-year period after the moratorium. Therefore, any new letters of credit treated in such a way would become quite expensive for the issuing bank. Without a guarantee from the governor of the South African central bank, no leading US bank is going to issue any more such letters of credit.

The rand declined again on September 3, to $0.42, perhaps indicating that neither the emergency financial measures nor the emergency visit to Western financial centers by the governor of South Africa's central bank, Gerhard de Kock, had been enough to restore confidence in South Africa's economy. It is apparent that confidence will not be restored without the cessation of violence and civil upheaval.

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RECENT DEVELOPMENTS

JAPAN

Two additional nuclear units recently began commercial operation in Japan. Tokyo Electric Power Company's Fukushima Unit II-3 (an 1,100-MWe BWR) and Kansai Electric Power Company's Takahama Unit 4 (an 870-MWe PWR) together increase the total number of commercial nuclear power plants in Japan to 30, having a combined total capacity of 22,531 MWe. The addition of Takahama Unit 4 to Kansai EPC's electricity grid increased the utility's nuclear generation to nine plants with a capacity of 7,408 MWe, the largest operational capacity in Japan at the time. Sixteen days later, Tokyo EPC's latest addition increased its operational nuclear plant capacity total to 7,996 MWe. In addition, the Fukushima unit established, for the plant's size and type, a new Japanese construction record of 55 months from start of construction to commercial operation. The expected addition of the 1,100-MWe Kashiwazaki Unit 1 BWR in October 1985 will further enhance Tokyo EPC's nuclear capability. The unit achieved criticality in December 1984 and is currently undergoing final testing.

In addition, the Power Reactor and Nuclear Fuel Development Corporation (PNC) announced that in October 1985 it will start construction of its 280-MWe demonstration fast breeder reactor, Monju. The often-delayed project, initially scheduled for 1985 operation, is now expected to be completed in the early 1990s.

Further information was announced recently regarding plans to construct enrichment and reprocessing facilities at a combined site at Rokkasho-Mura in the northern part of Japan's main island of Honshu (see Report 203). The reprocessing facility, scheduled for operation in 1995, will have an 800 tonne-per-day capacity. Japan Nuclear Fuel Services (JNFS), the utility-sponsored entity which will own the reprocessing facility, will contract to Mitsubishi Heavy Industries (MHI) as the lead company for design and construction. MHI will subcontract to a group of participating companies, including Toshiba, Hitachi, Mitsubishi Metals, and Sumitomo Metal and Mining. The Société Generale pour les Techniques Nouvelles (SGN) of France has been providing technical support for the project planning, and is expected to continue to do so as contractual arrangements are finalized by the end of 1985.

Japan Nuclear Fuel Industries (JNFI), another utility-sponsored company which will build and operate an enrichment facility at the same location, has finalized plans for the transfer of enrichment technology from PNC, which developed the technology as part of a government-funded program. This event will provide the basis for subsequent transfer of government-sponsored technology to the private sector. However, commercial considerations that may be involved in the arrangement have not yet been disclosed. Current plans for the enrichment facility call for a two-stage implementation: a 150,000 SWU-per-year capacity by year 1991 and a 1.5 million SWU-per-year capacity by year 2000 (or one-sixth of anticipated Japanese requirements).

In a related development, Uranium Enrichment Machinery Company (UEM) announced that in October 1985 it will begin construction of a factory for fabricating centrifuges for use in the JNFI enrichment facility. The UEM facility, located near Sendai City in northern Honshu, is scheduled for September 1986 completion. UEM is a joint venture company owned by Hitachi, Toshiba, and MHI, as well as various private companies which supported hardware development for PNC's enrichment technology.

* * *

Japanese research and development of a laser enrichment process has accelerated following the US DOE's decision to concentrate on the AVLIS method for future enrichment technology. In early August, Riken, a Japanese company, announced that its initial molecular laser enrichment experiments were successful. An infrared laser was applied to gaseous uranium hexafluoride (a molecular, rather than atomic, configuration) to separate fissionable U_{235} isotopes. Although the separation efficiency was low, experimenters view it as a successful step in the development of laser separation.

Expériments were conducted by cooling UF_6 gas to 35° C. below zero and exposing it to a high-efficiency, high-power hydrogen laser. Officials expect that the enrichment efficiency can be improved by cooling the gas to approximately 200° C. below zero.

Japan Atomic Energy Research Institute (JAERI) also is studying the atomic separation process, which uses atomic uranium metal instead of UF_6. It is likely, however, that research and development of the molecular method will be accelerated because of the advantages of using UF_6 gas, which is already used in centrifugal separation processes.

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PRIMARY MARKET CONVERTERS—COMURHEX

Introduction

The French company Comurhex operates uranium conversion facilities capable of producing approximately 12,500 MTU as UF_6 per year, ranking it second in nameplate capacity among the five free world converters (Table 1). Its facilities are located at two plant sites in France, one designed to produce uranium tetrafluoride (UF_4) and uranium metal (U), located near Narbonne on the Mediterranean coast, and one designed to produce fluorine (F_2) and uranium hexafluoride (UF_6), located at the Pierrelatte nuclear fuel cycle complex on the Rhone River south of Lyon (Figure 1 and Figure 2, top). Comurhex is the only one of the five commercial converters that has not yet sold conversion services directly to US utilities; its clientele has consisted primarily of European and Asian companies. Nevertheless, Comurhex currently is operating at approximately 70 percent of capacity, a rate equivalent to approximately 8,750 MTU per year. That production rate is probably the highest in the world right now as the North American converters have been particularly hard hit by the slump in the primary market for conversion services. Two reasons for this situation, in spite of the generally high level of UF_6 inventories held by market participants, are:

1. The relative stability of demand from Comurhex's traditional customers, most importantly Electricite de France (EDF) and Cogema;

2. The recent growth of the commercial enrichment business in Europe, which also corresponds with the declining overseas market share of the US DOE.

History and Ownership

Comurhex was incorporated in 1971 with the merger under a single management of the Malvesi UF_4 and U metal plant near Narbonne and the Pierrelatte fluorine and UF_6 plant. Previously the two plants had been owned by separate entities. The principal function of the Malvesi plant prior to 1971 had been to produce U metal for the French graphite-gas reactor (GCR) program, while the Pierrelatte facility produced UF_6 primarily for research and defense applications. Subsequently, the French government's decision in the early 1970s to pursue the commercial development of light-water reactors (LWRs), and the organization of the commercial enrichment consortium Eurodif, caused the focus of production at Malvesi to shift to UF_4 that could be fluorinated at Pierrelatte, yielding the UF_6 necessary for commercial uranium enrichment. Some historical UF_6 production figures, shown in Table 2, reflect the evolution of Comurhex's operations. The production of U metal has declined steadily since the peak of 1,000 MTU in 1976.

Ownership of Comurhex is held by Uranium Pechiney (51 percent), Cogema (39 percent), and Mokta (10 percent). Uranium Pechiney is a wholly owned subsidiary of the metals and chemicals company Pechiney, which was nationalized in 1983. Cogema is the state-owned fuel cycle company administered by the CEA (Commissariat a l'Energie Atomique), which has responsibility for both civilian and military nuclear fuel development. Mokta is a French mining company belonging to the Imetal group, of which Cogema is a leading shareholder. (See Report 187, March 1984, for an article on the French nuclear power structure.)

Table 1

FREE WORLD CONVERTERS

Company	Plant Location	Production Capacity (MTU as UF_6 per year)
Allied Corporation	Metropolis, Illinois	12,700
Comurhex	Pierrelatte, France	12,500
BNFL[1]	Springfield, UK	9,500
Sequoyah Fuels	Gore, Oklahoma	9,100
Eldorado Resources Ltd.	Port Hope, Ontario, Canada	9,000[2]

[1]British Nuclear Fuels Limited.

[2]An older conversion facility with a nameplate capacity of 4,500 MTU as UF_6 per year is not currently in service.

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FOCUS

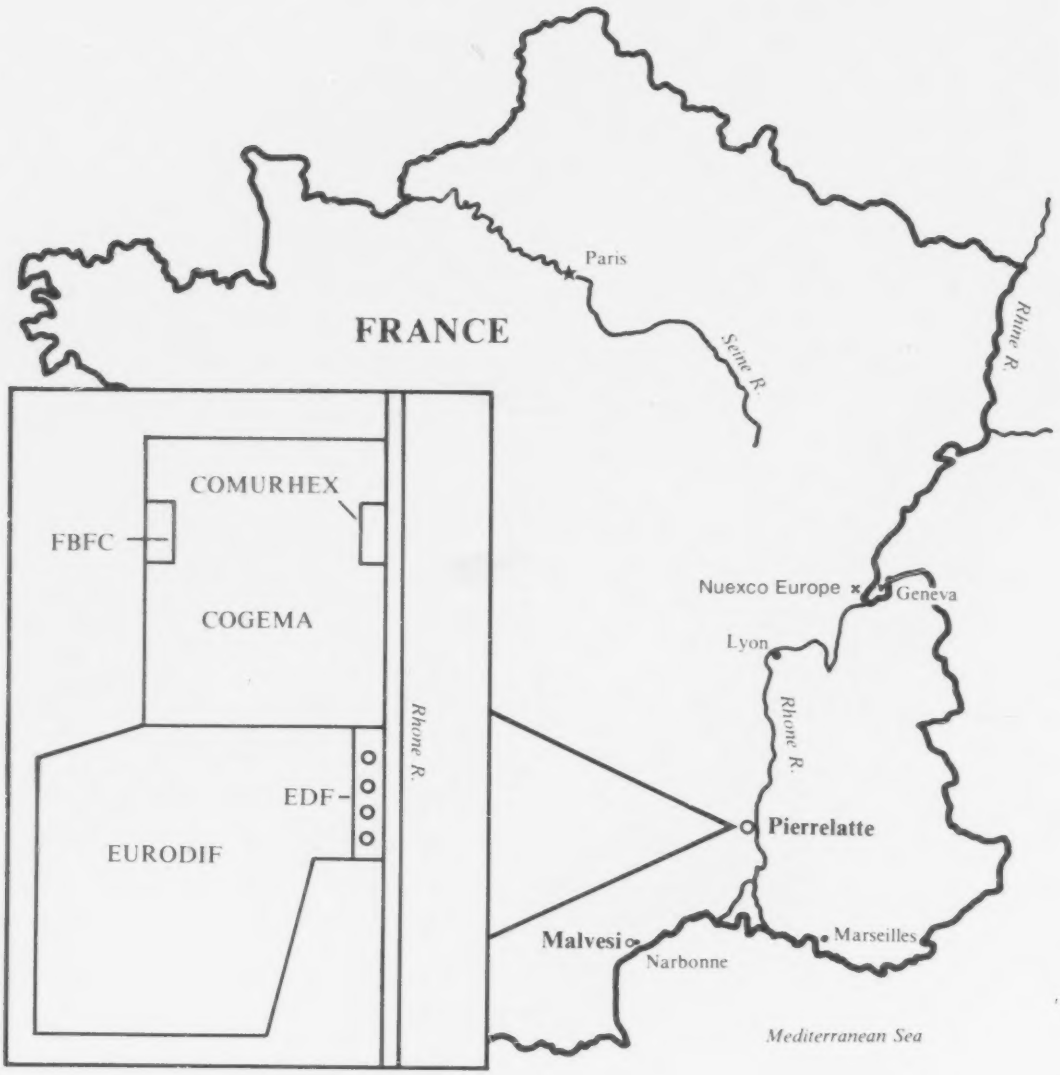

Figure 1. Location of Comurhex conversion plants. Concentrates are converted to UF_4 at Malvesi and trucked to Pierrelatte for conversion to UF_6. Inset illustrates the Pierrelatte nuclear fuel cycle complex, which includes EDF's four-unit Tricastin nuclear power plant (35 hectares), the Eurodif enrichment plant (250 hectares), the Comurhex plant (13 hectares), a FBFC (Societe Franco-Belge de Fabrication de Combustible) fabrication plant (12 hectares), and the Cogema research and national defense plant (200 hectares).

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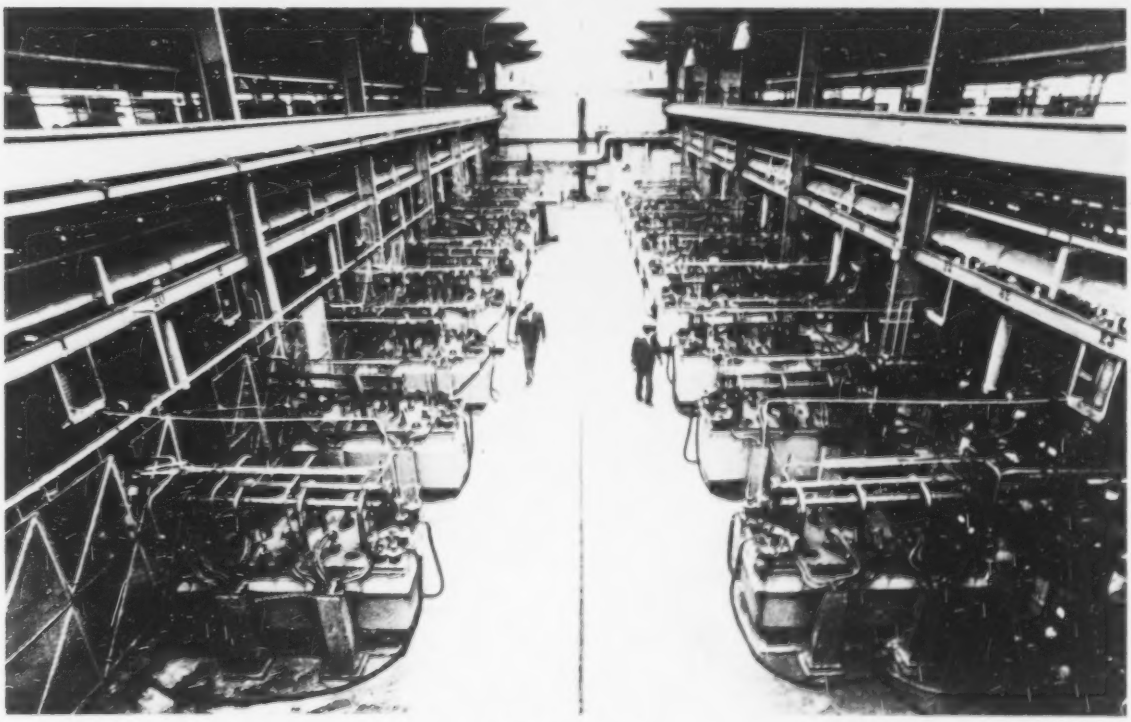

Figure 2. Above is an aerial view of the Pierrelatte UF_6 conversion plant. Below is the interior of the fluorine (F_2) production plant at Pierrelatte.

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Table 2
HISTORICAL UF_6 PRODUCTION AT COMURHEX

Year	MTU as UF_6
1973	1,700
1976	6,300
1980	10,900
1984	8,500

Delivery of Concentrates

Uranium from French mills arrives directly at the Malvesi plant by truck or rail, while concentrates from overseas sources normally arrive in France by ship at Marseilles or Bordeaux. They are then transported by rail to the Malvesi plant, approximately 200 kilometers away. Upon arrival, the feed material is weighed and sampled by Comurhex technicians, employing the falling stream sampling method. Following the determination of weights and assays, samples are distributed to the parties involved, and one is kept for umpiring in case of a dispute. The bulk concentrates are stored in the open yard until needed. Most customers keep their material as concentrates until UF_6 is required to fill enrichment orders, because concentrates are easier, safer, and cheaper to store than UF_6. The storage lot at the Malvesi plant site contains approximately 30,000,000 pounds U_3O_8.

Conversion to UF_6

Comurhex employs a wet conversion process, as do most of the commercial converters. The wet process begins with the dissolution of concentrates in nitric acid (Figure 3). The nitric acid solution flows through a counter-current exchange filter to yield a concentrated, impure solution of uranyl nitrate. Within a large purification column the uranyl nitrate solution is agitated with a solution of 40 percent tributylphosphate (TBP) and 60 percent dodecane ($C_{12}H_{26}$). Uranyl nitrate forms a complex with TBP, and is subsequently extracted from the complex in a separate purification column, yielding a pure solution of uranyl nitrate. The addition of ammonia (NH_3) to the pure solution forms ammonium diuranate (ADU), which is dried at high temperature. The injection of NH_3 at a temperature near 700 degrees C. produces UO_2. After cooling, the UO_2 reacts with hydrofluoric acid (HF) to yield uranium tetrafluoride (UF_4), or green salt.

The bulk of the UF_4 produced at Malvesi is shipped in special tank trucks to Pierrelatte, approximately 250 kilometers north. There it is airlifted into storage bins adjacent to the fluorination plant. Within the plant are three fluorination columns containing flame reactors. Fluorine gas moving through pipes from the nearby F_2 plant is injected into the fluorination columns and reacted with UF_4 at temperatures near 1,500 degrees C., producing UF_6. The UF_6 is filtered, cooled, and filled into standard Type 48Y cylinders for storage. Comurhex's UF_6 storage lot can hold approximately 175 cylinders (1,500 MTU as UF_6), depending on shipping schedules. UF_6 destined for Eurodif is trucked to the enrichment plant lot a few hundred meters south of the Comurhex facility. Eurodif has a much larger UF_6 storage capacity.

Comurhex operates the only commercial fluorine (F_2) plant in continental Europe at Pierrelatte (Figure 2, bottom). It sold its technology for F_2 production, the electrolysis of hydrofluoric acid (HF), to Eldorado of Canada. Also at Pierrelatte, Comurhex operates the only commercial facility which can reconvert to UF_6 uranium from reprocessing, or low enriched uranium of up to 2.5 weight-percent U_{235} in various forms. The reconversion facility currently has the capacity to process approximately 300 MTU per year. Comurhex is prepared to build commercial-scale facilities for this purpose if it becomes economical to do so. The company's management is currently evaluating a project plan, called Urex 2000, that would entail the construction of a modular plant able to convert 1,200 MTU per year of reprocessed material by the end of the decade.

Marketing

Comurhex has benefited from the ongoing expansion of the French nuclear power program, which is currently about half the size of the US program. It has thus far supplied most of EDF's conversion requirements. Nevertheless, in recent years foreign orders have accounted for more than 40 percent of its business (foreign sales accounted for more than 50 percent during the years 1977 to 1981). Secondary market inventory sales, inventory drawdowns, and cutbacks in nuclear power programs outside of France have affected Comurhex, if not quite as drastically as they have affected some other converters.

Comurhex has reported a recent surge in orders for the second half of the 1980s. The development of the European enrichment industry as competition for the US DOE is accelerating the recovery of the market for conversion services for Comurhex. For economic and/or political reasons, many European companies have chosen to avoid

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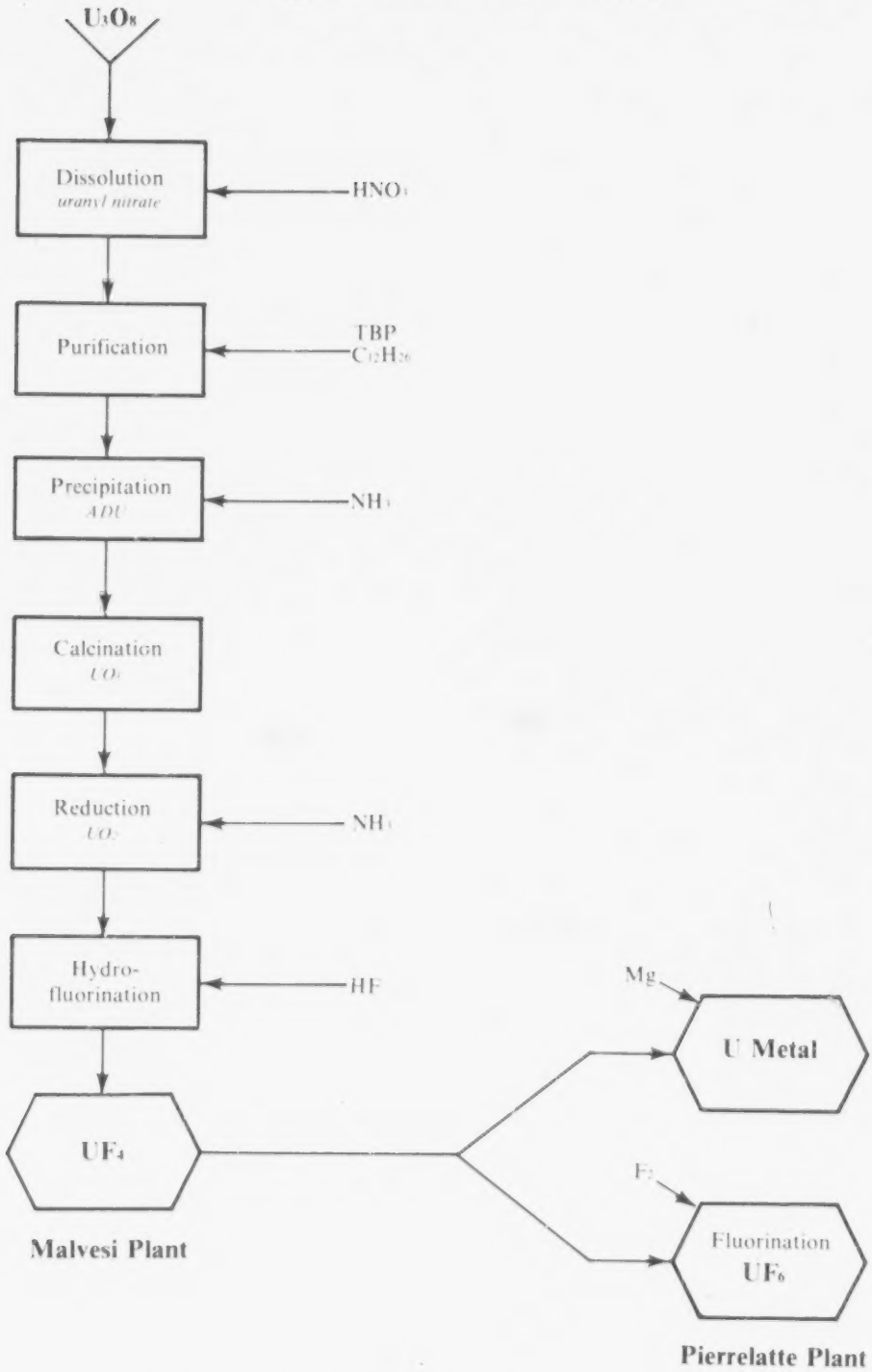
Figure 3. Comurhex Conversion Process.



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American suppliers, at least for the intermediate term. Comurhex is currently offering a high degree of flexibility to its customers, many of whom suffered from rigid contracts in past years.

A number of long-term variables make it difficult to predict whether Comurhex will be able to sustain its market into the 1990s. The most important is the status of the Canadian upgrading requirement, which stipulates that U_3O_8 produced in Canada must be exported as UF_6 if possible. Canada is already the world's largest producer of U_3O_8, and all indications suggest that its position of leadership will continue to grow, particularly when the Cigar Lake deposit is developed. A number of European utilities are now purchasing Canadian uranium, and with each new purchase other converters potentially lose business to Eldorado Nuclear Ltd. Consequently, the future of the Canadian upgrading policy will have an effect on the European conversion business.

Comurhex's market could also change for other reasons. For example, a rupture in the European uranium trade with Southern Africa would present serious difficulties, as much of the concentrates currently run through the Malvesi plant are of South African or Namibian origin. The converter's share of the Japanese market is likely to diminish as the Japanese develop domestic conversion facilities. The Japanese government recently initiated a two-year study of the economics of a domestic plant.

CORRECTIONS AND AMPLIFICATIONS

The Raw Materials article on US uranium production in Report 204 contained several errors, both typographical and otherwise.

1. On page 19, under the heading "Projects Deferred," the first item should read "Conoco, one mine, Crownpoint, New Mexico," and the second item should read "Cotter, JD7 mine, Uravan District, Colorado."

2. On page 20, under the heading "Project Start-up" for 1982—Plateau Resources' 750 tpd mill at Ticaboo, Utah was also closed later that year.

3. On page 22, under the heading "Project Closures"—Quivira Mining's indefinite closure of all mining operations in McKinley, New Mexico should have been included.

4. On page 24, the first line should read "... but operating *mills* had increased to 26, the highest number to date."

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EXCHANGE AND TRANSACTION VALUES SINCE JANUARY 1980

Determined as of the last day of the month indicated

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HISTORICAL MARKET DATA

HISTORICAL EXCHANGE VALUES

Determined as of the last day of the month indicated (US Dollars/lb. U_3O_8)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1968	—	—	—	—	—	—	—	6.35	6.35	6.40	6.45	6.50
1969	—	6.35	6.10	6.10	6.25	6.25	6.20	6.20	6.15	6.15	6.15	6.20
1970	6.30	6.30	6.30	6.30	6.30	6.30	6.30	6.20	6.15	6.15	6.15	6.15
1971	6.20	6.20	6.20	6.20	6.15	6.05	6.00	5.95	5.95	5.95	5.95	5.95
1972	5.95	5.95	5.95	5.95	5.95	5.95	5.95	5.95	5.95	5.95	5.95	5.95
1973	5.95	6.00	6.10	6.20	6.45	6.50	6.50	6.50	6.50	6.50	6.75	7.00
1974	7.70	7.90	8.00	9.00	9.50	10.50	11.50	12.00	12.50	14.00	14.75	15.00
1975	16.00	16.00	18.00	20.00	21.00	23.00	24.70	26.00	26.00	28.50	30.00	35.00
1976	32.50	37.00	39.25	40.00	40.00	40.00	40.00	40.40	41.00	41.00	41.50	41.00
1977	41.35	41.50	41.60	41.60	42.00	42.25	42.25	42.25	42.40	42.75	43.20	43.20
1978	42.90	43.25	43.25	43.25	43.40	43.40	43.40	43.10	43.25	43.00	43.25	43.25
1979	43.25	43.25	43.25	43.25	43.25	43.00	42.70	42.70	42.20	42.20	41.00	40.75
1980	40.00	38.00	35.00	32.00	32.00	31.50	31.50	30.00	28.50	28.00	28.00	27.00
1981	25.00	25.00	25.00	25.00	25.00	24.25	23.50	23.50	23.50	23.50	23.50	23.50
1982	23.00	23.00	22.50	20.75	20.50	19.25	18.25	17.00	17.00	17.50	19.75	20.25
1983	21.50	21.75	22.25	23.25	23.50	23.50	24.00	24.00	24.00	23.50	22.50	22.00
1984	20.50	17.50	17.00	17.75	17.75	17.50	17.50	17.50	17.50	16.00	15.50	15.25
1985	15.00	15.00	15.00	14.25	15.00	15.00	15.75	**16.00**				

HISTORICAL TRANSACTION VALUES

Determined as of the last day of the month indicated (US Dollars/lb. U_3O_8)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1976	—	—	—	—	39.60	39.70	39.70	40.40	40.30	40.60	40.70	40.70
1977	41.30	41.30	41.40	41.50	42.80	42.90	43.00	42.60	42.50	42.80	42.90	42.90
1978	43.10	43.30	43.70	43.60	43.60	43.20	43.30	43.40	43.40	43.60	43.40	43.70
1979	43.60	43.80	43.70	43.40	43.60	43.70	43.70	43.60	43.60	43.60	43.50	42.30
1980	42.00	39.30	38.60	38.40	37.90	37.60	37.30	31.60	30.60	29.00	28.70	27.70
1981	27.20	27.20	27.00	25.70	25.70	24.50	24.40	24.30	23.90	24.10	24.10	24.00
1982	24.00	23.70	23.40	22.60	22.70	21.50	20.30	19.10	17.30	17.00	17.55	18.80
1983	19.35	20.00	21.35	21.40	22.35	22.45	23.50	23.60	23.65	23.65	23.85	23.85
1984	23.05	22.50	19.25	17.90	17.00	16.50	16.60	16.40	16.55	16.05	15.90	15.90
1985	16.20	15.70	15.05	14.90	14.45	14.60	14.75	**15.10**				

HISTORICAL CONVERSION VALUES

Determined as of the last day of the month indicated (US Dollars/lb. U as UF_6)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1981	1.20	1.20	1.20	1.40	1.15	1.15	1.15	1.10	1.10	1.10	1.20	1.20
1982	1.20	1.20	1.20	1.20	1.00	1.00	1.00	0.90	1.10	1.60	1.45	1.45
1983	1.20	1.40	1.40	1.20	1.20	1.20	1.10	1.10	1.00	0.60	0.60	0.60
1984	0.60	0.30	0.80	0.80	0.80	0.00	0.00	0.80	1.00	1.00	0.80	0.80
1985	1.00	1.00	1.00	1.50	1.50	1.60	1.60	**1.60**				

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AUSTRALIA

	Price Index of Materials Used in Manufacturing Industry—All Groups[1] (1969=100)	Award Rates of Pay Indexes Australia—Adult Males In Mining Wage and Salary Earners, Weekly Rates[2] (1976=100)
1983 Avg.	401.2	181.8
May 1984	403.6R	197.0
Jun 1984	404.7	197.4
Jul 1984	408.3	197.4
Aug 1984	413.1	197.4
Sep 1984	411.9	197.4
Oct 1984	408.4	197.4
Nov 1984	407.1	197.4
Dec 1984	405.9	197.4
Jan 1985	409.3	197.4
Feb 1985	416.0	197.4
Mar 1985	429.4R	197.4
Apr 1985	440.2R	202.3
May 1985	451.8	202.3
Jun 1985	—	202.4

P = Preliminary R = Revised since last month

CANADA

		Wage-earner Data: Average Hourly Earnings (C$)[2]					
	Industry Selling Price Index: Manufacturing[1] (1971=100)	Uranium Mines (SIC 057)	Metal Mines* (SIC 051-059)	Mines, Quarries and Oil Wells[3] (SIC 051-099)	Primary Metal Industries Non-ferrous[4] (SIC 296)	Primary Metal Industries Non-ferrous[4] (SIC 298)	Chemicals and Chemical Products[5] (SIC 372-379)
1983 Avg.	298.8	—	**	14.30	—	—	11.17
Aug 1984	312.7	17.24	15.36	14.92	12.44	10.34	11.78
Sep 1984	312.3	17.68	15.96	15.34	12.51	10.52	11.90
Oct 1984	312.3	17.64	16.15	15.26	12.69	10.56	11.96
Nov 1984	313.6	18.04	16.13	15.43	12.47	10.51	11.96
Dec 1984	314.2	17.95	16.39	15.60	12.16	10.40	11.99
Jan 1985	315.8	18.05	16.13	15.60	12.32	10.80	12.04
Feb 1985	316.5R	18.78	16.41	15.68	12.52R	11.05	12.06
Mar 1985	317.9	18.24	16.21	15.57	12.43	10.97	12.02
Apr 1985	318.2R	18.63	16.44	15.80	12.81	11.23	12.04
May 1985	318.8R	19.41R	16.51R	15.63R	12.76R	11.25R	12.15
Jun 1985	318.9	18.49P	16.20P	15.51P	12.89P	11.26P	12.12P
Jul 1985	319.5	—	—	—	—	—	—

P = Preliminary R = Revised since last month

For annual averages prior to 1983, and for notes pertaining to these statistics, see pages 23-26 of Report 190 of June 1984.

* The 1980 average for Metal Mines was incorrectly reported as 10.59. The correct average is 10.58 (see Report 190).

** Two different methods were used in the 1983 "Metal Mines" category in reporting survey data, and Statistics Canada did not publish a 1983 average. The March 1983 figure for the old method was 14.73 and for the new method was 14.84. The published average for 1983 in Report 190 was a Nuexco calculation based on the available monthly statistics for 1983 with the exception of the March figure, where only the 14.84 value was taken into account.

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GOVERNMENT STATISTICS

REPUBLIC OF SOUTH AFRICA

	Average Declared Working Costs per per Metric Ton of Gold Ore Milled (Rand)[1]	Tonnage-Weighted Index of Average Working Costs per Metric Ton of Gold Ore Milled (March 1982=100)[2]	Consumer Price Index[3] (1975=100)[4]	Producer Price Index All Groups[5] (1975=100)	Total Employment in Mining and Quarrying (Code 35)[6]	Total Salaries and Wages in Mining and Quarrying (1,000 Rand) (Code 40)[6]
1983 Avg.	51.87	115.0	262.2	274.8	696,579	3,644,772
Jun 1984	56.95	126.2	291.2	295.3	717,009	347,121
Jul 1984	—	—	295.1	296.0	717,121	369,964
Aug 1984	—	—	297.0	300.8	721,905	361,357
Sep 1984	60.64	133.2	299.9	304.1	721,470	359,218
Oct 1984	—	—	303.7	308.7	717,865	363,755
Nov 1984	—	—	307.4	312.8	717,396	369,771
Dec 1984	62.92	138.6	309.4	315.9	701,198	365,234
Jan 1985	—	—	177.1*	166.6*	711,366	376,777
Feb 1985	—	—	182.8*	171.3*	727,932	361,823
Mar 1985	64.48	142.4	183.6*	173.0*	708,809	371,380
Apr 1985	—	—	187.4*	174.0*	724,187	369,005
May 1985	—	—	189.5*	177.7*	708,085	373,478
Jun 1985	67.42	148.9	191.9*	179.2*	—	—
Jul 1985	—	—	193.6*	—	—	—

*The basis for calculation for these indices has been revised to January 1980 = 100.

UNITED STATES

	Producer Price Index[1]		Consumer Price Index[2]	GNP Implicit Price Deflator[3]	Gross Average Hourly Earnings of Production or Non-supervisory Workers (US$)[4]			
	Industrial Commodities (1967=100)	All Commodities (1967=100)	(1967=100)	(1972=100)	Metal Mining (SIC 10)	Primary Non-ferrous Metals (SIC 333)	Chemicals and Allied Products (SIC 28)	Electric and Electronic Equipment (SIC 36)
1983 Avg.	315.8	303.1	298.4	215.63	12.57	13.43	10.59	8.65
May 1984	323.3	311.7	309.7	—	12.99	13.37	11.02	8.89
Jun 1984	323.9	311.4	310.7	222.40	12.96	13.40	11.03	8.91
Jul 1984	324.0	312.0	311.7	—	13.02	13.36	11.12	8.95
Aug 1984	323.5	310.9	313.0	—	13.10	13.51	11.13	9.00
Sep 1984	322.3	309.5	314.5	224.57	13.20	13.39	11.23	9.08
Oct 1984	323.2	309.4	315.3	—	13.23	13.53	11.32	9.09
Nov 1984	323.8	310.4	315.3	—	13.23	13.76	11.35	9.15
Dec 1984	323.0	309.9	315.5	226.10	13.28	13.66	11.37	9.27
Jan 1985	322.9	309.5	316.1	—	13.29	13.70	11.39	9.33
Feb 1985	322.5	309.2	317.4	—	13.30	13.73	11.39	9.33
Mar 1985	322.6	308.7	318.8	229.07	13.29	13.95	11.37	9.39
Apr 1985	323.8	309.3	320.1	—	13.43	13.62	11.48	9.40
May 1985	325.3	309.9	321.3	—	13.24	13.59R	11.46	9.39R
Jun 1985	324.7R	309.1R	322.3	230.62R	13.27P	13.69P	11.51	9.47
Jul 1985	324.3	309.0	322.8	—	—	—	11.61P	9.51P

P = Preliminary R = Revised since last month

For annual averages prior to 1983, and for notes pertaining to these statistics, see pages 23-26 of Report 190 of June 1984.

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REPRESENTATIVES AND CONSULTANTS

AUSTRALIA

Peter Stork
Oratom Consulting*
5 Gould Ave.
St. Ives
NSW 2075, Australia
Telephone: (61-2) 449-6783
Telex: 23976 (COMTLX)

JAPAN

Kazy Yokota
Japan Tech Services*
Ohkura Building (3F)
1-4-10 Shiba Daimon
Minato-ku, Tokyo, Japan
Telephone: (81-3) 431-6031, 6025
Telex: 242-5060 (JATECH J)

SOUTH AFRICA

Chris I. Von Christierson
Southern Prospecting (Pty) Limited*
P.O. Box 61409
Marshalltown 2107
Republic of South Africa
Telephone: (27-11) 838-1868
Telex: 4-89878 SA

TAIWAN

Edward Bee
Bee & Liang Company, Ltd.*
14 FL Universal Business Center
NO. 663, Tun Hwa South Road
P.O. Box 1396
Taipei, Taiwan R.O.C.
Telephone: (886-2) 704-9630
TWX: 785-11570 (BEELIANG)

UNITED STATES

Harold C. Lindberg*
83-A Hardee Lane
Whispering Pines, N.C. 28327
Telephone: (919) 949-3622

Ralph O. Smith*
141 Braemar Drive
Cheshire, Connecticut 06410
Telephone: (203) 272-6246

SPECIAL CONSULTANTS

James C. C. Stewart
U.K. Nuclear Industry

Claus C. Thiesen
Japan Nuclear Industry

W. Bryan Webster
International Business Development

J. Robert Wolcott
International Business Development

*Independent contractors representing Nuexco